



Analysis of middle atmospheric ozone and water vapour measurements and SD-WACCM simulations of the last two winters at Ny-Ålesund/Svalbard

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The microwave radiometers GROMOS-C (GROund based Ozone MONitoring System for Campaigns) and MIAWARA-C (Middle Atmospheric WATER vapour RAdiometer for Campaigns) are located at the Arctic research base AWIPEV at Ny-Ålesund/Svalbard (79N/12E) and continuously monitor the middle atmospheric ozone and water vapour profiles above Ny-Ålesund since September 2015.

Both instruments were built at the University of Bern, Switzerland. Microwave radiometry is ideal to study photochemical and dynamical processes on a diurnal time scale due to its high time resolution but it is also indispensable for long term observations and trend analyses. GROMOS-C is able to retrieve hourly ozone profiles where for MIAWARA-C the retrieval of two to four hourly water vapour profiles is realistic depending on tropospheric opacity. GROMOS-C is capable of measuring in the four cardinal directions (N-E-S-W) and therefore can provide measurements inside and outside of the polar vortex if the vortex edge is close to Ny-Ålesund.

We present the analysis of the diurnal cycle of ozone and the tertiary ozone maximum at an altitude of 70 km as observed by GROMOS-C. In the water vapour data of MIAWARA-C signs of two and five day wave activity have been identified and the descent rate within the polar vortex has been analysed. Special emphasis is given to the link between ozone and water vapour concentrations in the mesosphere. The simulations with the specified dynamics version of the whole atmosphere community climate model (SD-WACCM) are used to better understand and characterize processes in the arctic middle atmosphere.

Inter-comparisons of the data from our instruments are performed with OZORAM, the ozone radiometer of the University of Bremen which is also located at Ny-Ålesund, and with satellite and ozone sonde data.